CPAT FLEX Operation Manual (IRX1)

CPAT®

CONTINUOUS MONITORING SYSTEM

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1. General Information

1.1 About this Manual

This manual describes the components, installation and operation of the CPAT FLEX IRX1 unit.

You will find important safety information in this manual. We strongly recommend that all users read this manual. Use of this product other than for its intended application may compromise the unit's safety features.

1.2 Certifications

This section describes the certifications the IRX1 complies with.

1.2.1 Tests Specifications

FCC 47 CFR Part 15, Subpart B – Verification

ICES-003/NMB-003 Issue 4 February 2004

Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: Generic requirements.

1.2.2 Compliance

This Class A digital apparatus complies with Canadian ICES-003/NMB-003.

This Class A digital apparatus also complies with European EN61326-1: 2006.

1.2.3 Note

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his owns expense.

Modifications: Any modifications made to this device that are not approved by Effigis Geo-Solutions Inc., may void the authority granted to the user by the FCC to operate this equipment.

1.3 Technical Support

Effigis Technical Support Service is available from Monday through Friday from 9:00 AM to 5:00 PM Eastern Time.

Toll free from U.S. and Canada: + 1 888 495-6577

International: + 1 514 495-0018

Fax questions anytime to: + 1 514 495-4191

cpat@effigis.com

1.4 Calibration

Your IRX1 unit has been calibrated and tested in the factory, and does not need further calibration before use.

However, if the unit suffers damage and needs repair, it is recommended that the unit be return to an authorized Effigis service center there it will be properly re-calibrated.

As well, if your company requires regular calibration of all equipment, or requires a calibration certificate for the IRX1, a calibration service is available through Effigis.

For more information on calibration services, please contact your Effigis representative.

1.5 Explanation of Symbols Used

The following symbols are used in this Manual:

Symbol	Explanation
⚠	Caution. Indicates that operations or procedures, if carried out without caution, may cause personalinjury or damage to the unit.
✎	Note. Indicates additional information about the product.

1.6 Effigis Website

Effigis' website contains product specifications, information, press releases, brochure download and Frequently Asked Questions (FAQs). Please visit our website at:

http://effigis.com

2. System Components

The IRX1 is the receiver part of a find-and-fix ingress solution for broadband operators. It monitors signal transmitted over the air via the ITX1 that comes thru the cable network. The IRX1 RF entries are feed from the head end tests point return. Global operating status is displayed on the LCD located on the front panel of the unit. Once installed, it requires no further intervention to monitor and transmit results through CPAT web interface.

This section describes the IRX1 unit in detail including its accessories, and helps you get started by explaining the features, the powering and data interface on the unit.

2.1 Initial Verification

Your IRX1 unit is calibrated, and ready to use right out of the box. Upon reception, visually inspect each item for any damage that may have occurred during shipping. If you see any signs of physical damage, please contact Effigis:

- Callers from the U.S. and Canada can dial + 1 888 495-6577 (toll-free number).
- International callers can dial + 1 514 495-0018.

Make sure no items are missing. Your package should contain all the standard items as well as any accessories you may have ordered. If you ordered the IRX1 - Head-end Based Return Band Receiver kit, the following items are included:

- IRX1 rack mount unit.
- 2 Rack mount right angle brackets.
- AC/DC adapter.
- User manual.

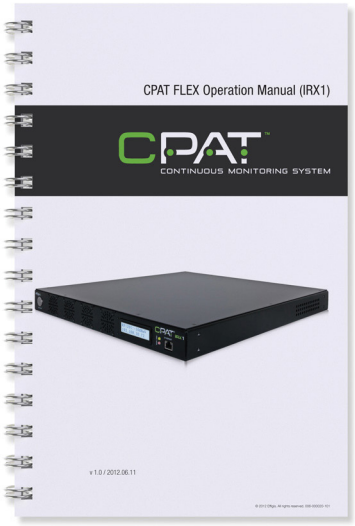
Figure 1: IRX1, rack mount brackets and AC/DC adapter

If any of the standard accessories are lost or damaged, you can order a replacement for the IRX1. Please quote the following part numbers when placing an order:

Part No.	Accessory Description
(1) 110-00003-001	AC/DC adapter
(2) 100-00006-001	IRX1 Operation Manual (This guide)

To place an order, please call Effigis at + 1 888 495-6577 or + 1 514 495-0018

1



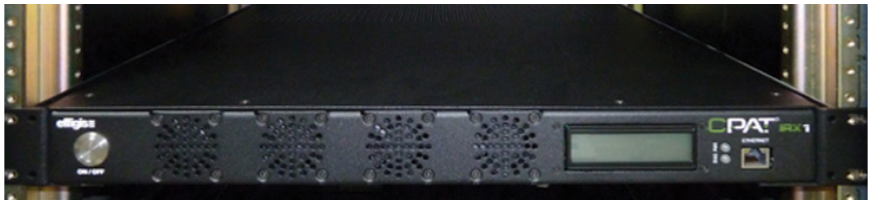
2

3. Installation

3.1 Rack Mounts Installation

CAUTION!

Leave space for front, back and lateral ventilation.



3.2 Connecting RF Entries

The RF entries are connected directly the return nodes tap. The maximum RF level entry is 40 dBmV per RF input. This is however the total RF level between 5 MHz and 45 MHz.

It is recommended to have a minimum of pads without having the frequency band (5-45 MHz) power to go over 40 dBmV per RF input.

If you want to combine nodes on the same RF entry, be aware that the IRX1 sensitivity performance might be affected: since the IRX1 tries to detect ingress, the incoming digital ingress signal is not always at the same level. Also, the measured value does not take into account the pads.

CAUTION!

Levels over this limit can distort the signal or damage the receiver's RF front-end. Contact the CPAT technical support for more information.

3.3 Electrical Installation

The AC/DC adapter is supplied with the equipment. It is compatible with 110V/220V voltages and 50/60 Hz power distribution networks.

3.4 Internet Connection

The IRX1- needs an access to the internet to transmit received measurement level to the CPAT servers and for automatic firmware update. Transfers vary from less than a 1MBytes to a maximum of ~7Mbytes per day depending of the intensity of the patrolling, the number of ITX1 in the sector and the number of failure on the network.

The IPv4 address is acquired with the use of DHCP. If no DHCP server is present on the network, the system will not be able to transmit data over the network.

Make sure that the unit has an access to the Internet and that the FTP port 21 is open. Without this access, it won't be able to communicate with our FTP and "Realtime Ingress Monitor" servers (RIM).

NOTE

It is recommended that you install the IRX1 behind a firewall, or a router with an integrated firewall, to avoid malicious or unauthorized connections (Ref: http://www.kb.cert.org/vuls/id/107886).

4. Setup

Make sure that the unit has an access to the Internet and that the FTP TCP port 21, remote assistance TCP port 26 and RIM UDP port 20000 is open (outgoing). Without those rules, it won't be able to communicate with our FTP and "Realtime Ingress Monitor" servers (RIM) and we won't be able to access the IRX1 for remote assistance.

If you want to combine nodes on the same RF entry, be aware that the IRX1 sensitivity performance might be affected: since the IRX1 tries to detect ingress, the incoming digital ingress signal is not always at the same level. Also, the measured value does not take into account the pads.

5. System Operation

5.1 Power On

To power on the unit, make sure that the power cable is properly connected to a power bar (recommended) and into the IRX1- then press the ON/OFF button on the front panel for 3 seconds then release it. You should see both lights on the front panel turn green then the PWR-light will turns red.

5.2 LED and LCD Information

The two front LEDs indicates the status of the unit.

PWR (power):

- When RED solid, the system is booting (takes about 1 minute to boot).
- When GREEN solid, the system is powered up and booted.

DIAG (diagnostic):

- When OFF, the system is working fine.
- When flashing GREEN, an ingress fault has been detected.
- When flashing RED, an error has occurred.

The LCD let the user know information about the unit.

Line 1: indicates the highest ingress measured value in the last second and the associated RF port.

Line 2: the IP address is displayed when there is no problem. When there is a problem, several messages can be displayed:

- "NO IP ADDRESS": No ip address is assigned to the unit. Verify that the network cable is plug into the Ethernet jack.
- "FTP ERROR": The IRX1 unit cannot transmit data to the Effigis FTP server. Make sure that the unit have access to the internet. Note that the unit can acquire a valid IP address, but if there is no routing to the internet, this message will be displayed.

5.3 Communication

The IRX1 uses an RJ-45 Ethernet (10/100 Mbits/sec) Cat 5 cable to connect to the network.

5.4 Shutdown

To power off the unit there are two modes Normal and Force shutdown, usually the user should privilege the normal shutdown mode to avoid undesired flash memory corruption, force shutdown should be use ONLY in case that the device is no more responding.

5.4.1 Mode Normal Shutdown:

In normal running application user should press the button press the front panel push button ON/OFF for 1 second then let the IRX1- ends up every process properly than a message will follow on the front LCD then the device will turn off.

5.4.2 Mode Force Shutdown:

To force the IRX1- to power down when it's running, press in the ON/OFF button on the front panel for 3 seconds. When the unit stops, you can release the button. As it was mention previously this is not the ideal shutdown method.

6. System Maintenance

6.1 Cleaning of the Equipment

Your IRX1 unit can be wiped clean with a damp cloth. Do not immerse the unit in water. Avoid solvents and commercial cleaners.

6.2 Preventative Maintenance

The technician shall do periodic visual inspections on the RF connections to make sure that there is nothing loose or broken. Both can affect the performance of the system. In case that a replacement is required, please contact Effigis for more information.

7. Real-time Ingress Monitor (RIM) on your Smart-Phone

The RIM service we provide, consist of a web site that receive in real-time the ingress information receive at the receiver. Its purpose is to assist technicians on the field to locate with precision the source of Ingress on the cable network.

7.1 Login the RIM Website

To consult data on the RIM the user must have a smart phone or a laptop with at least an access to the internet. The user must have a CPAT profile, which consist of a username and a password to login on the website www.cpat-solution.com/RIM.

Figure 1: RIM Login page

NOTE

The RIM is also available as a mobile application for iOs and Android. To download it, connect to the Apple App store (iTunes) or the Android App store (Google Play), and download the "CPAT" app. The first module within this app is an enhanced version of the RIM software on the web.

7.2 Choose the Proper ITX

Once the user is logged in the website he must choose the proper ITX from the list and then he will be able to view all the data available from this particular ITX. Remember that the higher the value is, the closer the trouble is.

Figure 2: Chose an ITX from the list

8. Updates and Recovery

The IRX1- device can be update automatically or manually. Usually the system should update its firmware when needed via updates provided from our FTP website.

8.1 Automatic Update

The IRX1- device is usually automatically updated when needed. The updates are distributed from our FTP server to the device. All update are tested to ensure high quality and efficiency in our product. There is no need for external intervention on the device to update it using the automatic update.

8.2 Manual System Recovery

See the remote troubleshooting section.

9. Remote Troubleshooting

It is possible to access the IRX1 for remote assistance. Also, manual firmware and script updates can be achieved. If the problem is the internet connection, it will not possible to do so.

Appendix A – Specifications

A.1 System

Operating frequency selection/Bandwidth	06.78 MHz: 30 kHz 13.56 MHz: 14 kHz 27.12 MHz: 30 kHz
Measurement range	-24 to 12 dBmV
Sensitivity	-24 dBmV (BER < 10^-6) (attenuator @ 0 dB)
AGC attenuator	0-15 dB in 0.5 dB steps
Level accuracy	±2 dB on signal pulses
Maximum input level	40 dBmV per RF input (integration in the 5 to 45 MHz band)
Monitoring mode	Continuous shared detection between 8 RF ports
Frame capture time	10 ms
Continuous ingress detection capability	100 events/sec/IRX1
Communication port	10/100 Base-T Ethernet
Communication protocol	IP (version 4)
Power	120 VAC, 0.7A (60W) fully loaded
Operating temp	0°C – 60°C (32°F – 140°F)
Storage temp	-20°C – 80°C (-4°F – 176°F)

A.2 Physical

Dimensions	1.75” x 16.60” x 18.50” [H x W x D] 4.5 cm x 42.2 cm x 47.0 cm
Weight	4 Kg
Maximum relative	humidity 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F).

Appendix B – Our Services

Effigis offers a portfolio of services to deploy and support purchased equipment through its Customer Support organization. Customer Support is standard with every product sale and consists of business hour technical assistance, in-warranty repair and calibration.

B.1 System

Customer Support is accompanied with the sale of every Effigis product. Customer Support services include:

- Product and Service Literature.
- Technical Assistance (Business Hour).
- Equipment Repair (Under Warranty Repair and Calibration Services).
- Equipment Return Authorizations.

Contact a Customer Support representative through your local distributor or by accessing www.effigis.com for information on calibration and warranty policies.

B.1.1 Equipment Return Instructions

Please contact your local Customer Support location via telephone for Return Authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- The serial number, product type, and model.
- Warranty status (If you are unsure of the warranty status of your instrument, contact Effigis' Customer Support).
- A detailed description of the problem or service requested.
- The name and telephone number of the person to contact regarding questions about the repair.
- The return authorization (RA) number.

If possible, return the equipment using the original shipping container and material. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting Effigis Support. Effigis is not liable for any damage that may occur during shipping. The customer should clearly mark the Effigis' issued RA or reference number on the outside of the package and ship it prepaid and insured to Effigis.

Equipment repaired or replaced under warranty will be returned at Effigis's expense to Customer (Canada/USA) or Effigis' representative (all other countries).

B.2 Limited Product Warranty

B.2.1 Hardware

Effigis warrants to the original end user (Customer) that the new Effigis branded products will be free from defects in workmanship and materials, under normal use, for one (1) year from the date of original shipment.

Effigis warrants repaired products for ninety (90) days from date of shipment. Any Product repaired or replaced under warranty is only warranted for the period of time remaining in the original warranty for the Product.

Any third party products, including software, included with Effigis products are not covered by this Effigis warranty and Effigis makes no representations or warranties on behalf of such third parties. Any warranty on such products is from the supplier or licensor of the product.

B.2.2 Software

Effigis warrants to the Customer that new Effigis branded software and firmware will perform in substantial conformance to program specifications for a period of ninety (90) days from the date of original shipment. Effigis warrants the media containing software against failure during the warranty period.

Effigis makes no warranty or representation that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected.

B.2.3 Exclusions

This warranty excludes:

- Damage to the physical surface of the product, including cracks or scratches to any part.
- Damage caused by misuse, neglect, improper installation or testing, unauthorized attempts to open, repair, or modify the product, or any other cause beyond the range of the intended use.
- Use of the product with any non-recommended device or service if such device or service causes the problem.
- Installation or maintenance of Product by someone other than Effigis or persons certified by Effigis.
- Changes to the Customer environment in which Product was installed.

- Damage caused by accident, fire, power changes, other hazards, or acts of nature.
- Consumable Product or parts thereof (e.g., parts with an expected useful life of less than ninety (90) days).
- Product not returned in accordance with Effigis' RA procedure.

B.2.4 Refurbished Parts and Prior Testing

Product may incorporate reconditioned or refurbished parts or subassemblies and may have been used in testing prior to sale.

B.2.5 Exclusive Remedies

If any Product materially fails to conform to the limited warranty set forth in this Section (Limited Warranty) and actually fails during the applicable warranty period and under normal use, Effigis shall, at its sole discretion (i) repair or replace the non-conforming Product to remedy the nonconformity identified by Customer in accordance with this Section (Limited Product Warranty); or (ii) issue a credit to Customer for the amounts paid for the Product in exchange for return of the nonconforming Product, in which case Customer's licenses to any Firmware shall be automatically revoked. Customer hereby transfers to Effigis title and ownership of any parts that Effigis replaces.

B.2.6 Disclaimer

THE REMEDIES EXPRESSLY PROVIDED IN THIS SECTION WILL BE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES AND SHALL BE IN LIEU OF ANY OTHER RIGHTS OR REMEDIES CUSTOMER MAY HAVE AGAINST EFFIGIS WITH RESPECT TO ANY NON-CONFORMANCE OF PRODUCTS. EXCEPT AS SPECIFIED IN THIS LIMITED PRODUCT WARRANTY, EFFIGIS MAKES NO EXPRESS REPRESENTATIONS OR WARRANTIES WITH REGARD TO ANY PRODUCT. EFFIGIS DISCLAIMS ALL IMPLIED WARRANTIES, CONDITIONS, AND REPRESENTATIONS INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, REGARDLESS OF THE LEGAL THEORY ON WHICH SUCH IMPLIED WARRANTY MAY BE BASED, INCLUDING, WITHOUT LIMITATION, CONTRACT, COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

CPAT FLEX

IRX1 - Schematic Diagram

1. Internet Connection to CPAT Server

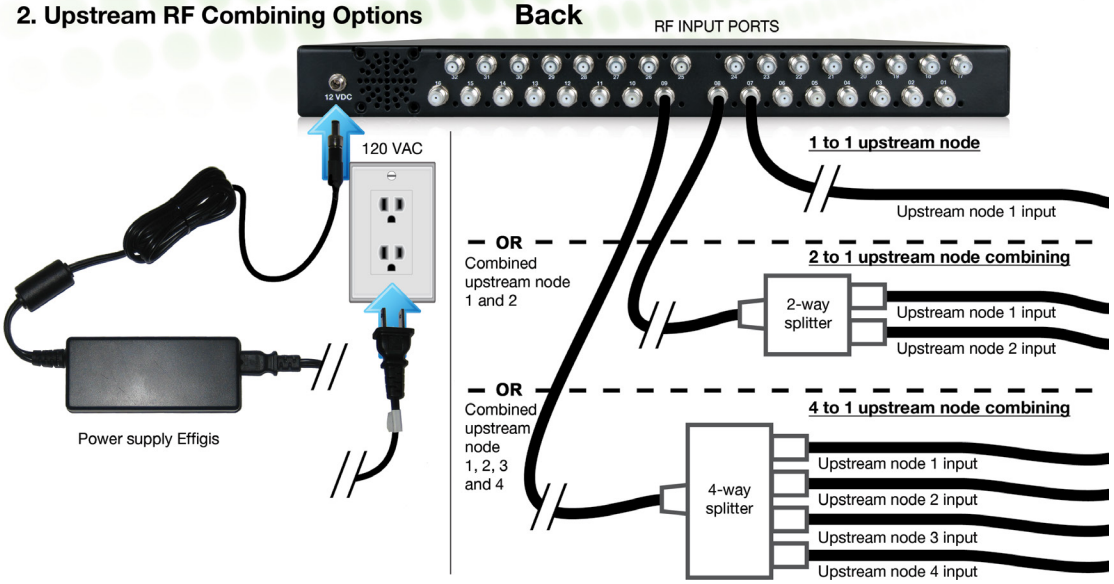
Front

Ethernet switch client

Ethernet 10/100 Base T

2. Upstream RF Combining Options

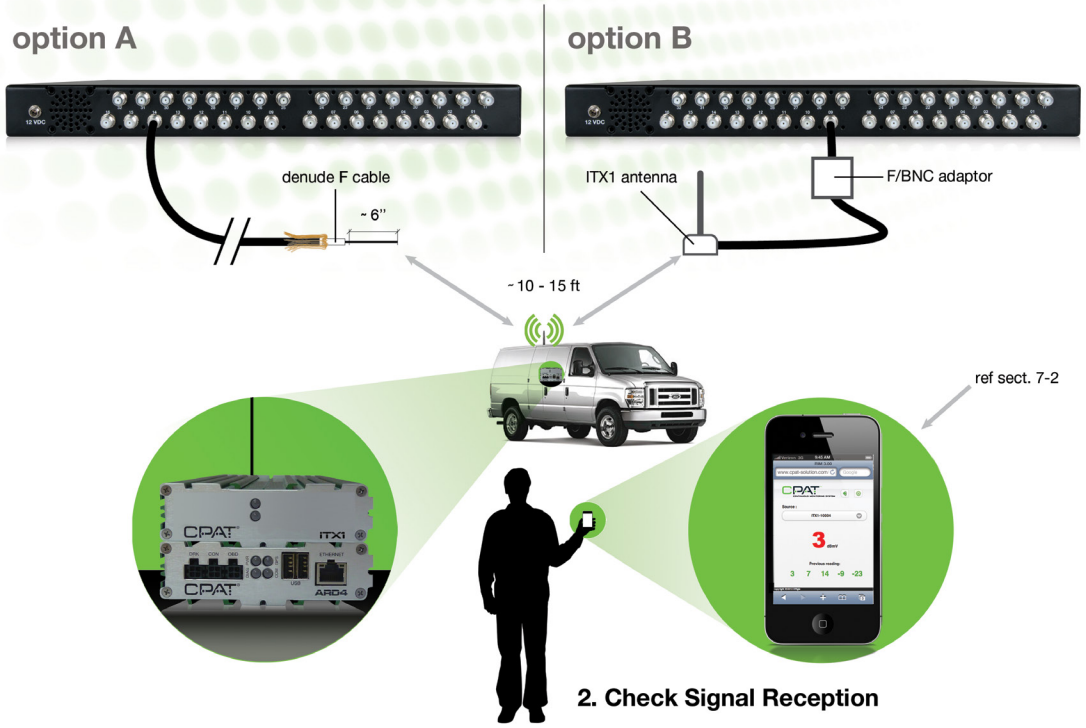
Back



CPAT FLEX

IRX1 - Schematic Diagram

1. Ingress Test Point Options



2. Check Signal Reception

effigis.com

1.888.495.6577